INTRODUCTION

The USGS defines Pennsylvania, New Jersey, Maryland, and Delaware as part of the Mid-Atlantic Region.

Pennsylvania's 45,333 square miles encompasses almost every geographical feature except desert and ocean. Mountains divide the land into three regions. The Appalachian Plateau, which splits the state in half from southwest to northeast, is a place of high, flat-topped divides, cut by stream-etched valleys. Many rivers and lakes are found in the northwest, with its rolling hills and valleys. Just east of the plateau country are the long, narrow mountain ridges and valleys that make up the Appalachian Mountains. Southeast of the mountains are the valleys of southeastern Pennsylvania.

New Jersey's approximate 8,000 square miles are bordered by New York to the north, Pennsylvania to the west and Delaware to the south. More than 50% of the state is defined as coastal plain. The highest point in the state (1803 feet) is High Point located in Sussex County, a topographic region known as the Appalachian Valley. Nearly 40% of New Jersey land is considered forest, while about 20% is used for agriculture. New Jersey offers nearly 200 miles of coastline.

Maryland's approximate 10,000 square miles extends from the Atlantic Ocean to the Allegheny Mountains in the west. The "western panhandle" of the state is etched with mountains and valleys. Several ski areas are found here, with elevations up to 3,300 feet above sea level. The remainder of the state is part of the coastal plain, with rolling hills in the central part of the state gradually flattening out toward the coastline of the Chesapeake Bay and Atlantic Ocean. In all, Maryland enjoys 3,190 miles of tidal shoreline, plus it has more than 4,000 lakes.

Delaware is the second smallest state in the nation, with only 1,982 square miles. It is only 96 miles long, and between 9 and 35 miles wide. The land, mostly near sea level, is flat. The exception is the undulating hills of the Brandywine River valley in the north. About half the state is farmland, but the main attraction is its miles of unspoiled beaches along the Atlantic Ocean.

The climate of these three states is dominated by the Westerlies. The Atlantic Ocean has the greatest influence on Delaware and New Jersey, but also has some influence on eastern Pennsylvania and Maryland.

Because of the goal of protecting life, property and economic interests on government land, land management agencies must be critically concerned with the control of wildfire, as well as the use of fire as a land management tool. Critical to this goal is timely and accurate weather information.

The purpose of the operating plan is to outline the meteorological support available to state management agencies in Pennsylvania, New Jersey, Maryland and Delaware as provided by the

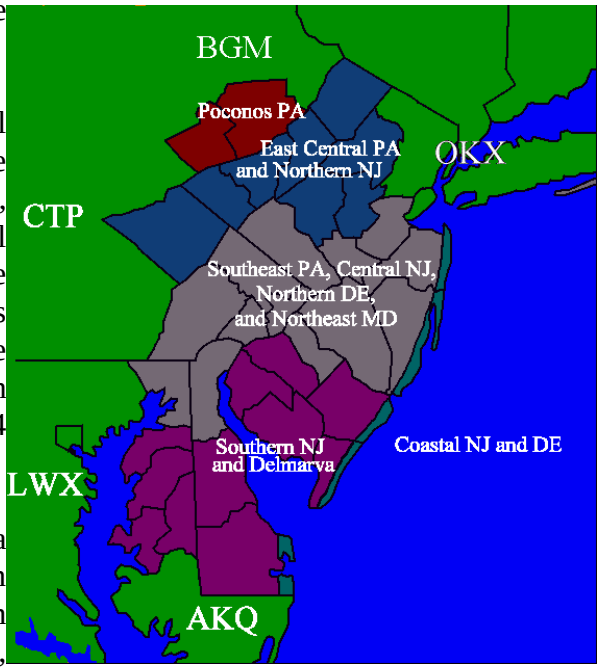
National Weather Service. Among these services are spot weather forecasts for wildfires. We also provide forecasts for prescribed burns and land management forecasts to federal agencies.

THE FORECAST AREA

We provide forecasts for Eastern Pennsylvania (from the Poconos Southward), all of Delaware, all of New Jersey except the extreme NE, and the eastern shore of Maryland. The forecast for the northeastern portion of New Jersey is prepared by Brookhaven, NY. The rest of the Maryland forecasts are prepared by Sterling, VA and Wakefield, VA.

THE "GFE-BASED" FIRE WEATHER FORECAST

The forecast is made up of fire weather zones climatologically grouped by counties throughout the forecast office area of responsibility. The New Jersey counties of Sussex, Warren, Morris, Hunterdon and Somerset counties are grouped together as "Northern New Jersey". Middlesex, Monmouth, Mercer, Camden, Burlington, and Ocean counties are grouped together as "Central New Jersey". Salem, Gloucester, Cumberland, Atlantic and Cape May are grouped as "Southern New Jersey". In Addition, the coastal zones of Eastern Monmouth, Coastal Ocean, Coastal Atlantic and Atlantic Coastal Cape May are grouped together as "Coastal New Jersey".



The product deadline is 500 am and 500 pm local time. Forecasts are issued 365 days a year. The forecast consists of three 12 hour periods (today, tonight and tomorrow) beginning at 500 am local time on the day of forecast preparation for the morning issuance, and 4 12 hour periods (tonight, tomorrow, tomorrow night, and the following day) for afternoon issuance. An extended 3 to 7 day forecast as well as an 8 to 14 day Outlook is also included.

The forecast includes Cloud Amount as a descriptive term, Chance of Precipitation in Percent, Precipitation Type, Max/Min Temperatures, Max/Min Relative Humidities, Wind Direction to 8 points of the compass and Speed in mph(am and pm), Precipitation Amount and Duration (if precipitation were to occur), Low Level Haines Index, Estimated Lightning Frequency using LAL, Mixing Height, Transport Direction and Speed, A Dispersion Descriptor which is a worded category identical a Dispersion Index, and Ventilation which is the product of the transport wind and mixing height.

HEADLINE... REQUIRED FOR FIRE WEATHER WATCH OR RED FLAG WARNING

THE DISCUSSION

The discussion is a brief plain language summary of the weather pattern as it pertains to our County Warning Area, focusing especially on the today and tonight periods. When particularly windy and dry conditions are expected, they should be mentioned in the FWF discussion and Area Forecast Discussion. Near Red Flag Warning conditions for Day 1 can be mentioned in the HWO at forecaster's discretion, in addition to the FWF discussion and AFD. The FWF should be updated when a Red Flag Watch/Warning is issued, changed, or ended.

GENERAL FORECAST

Parameter definitions:

Cloud Cover	(Cloudy, Mostly Cloudy, Partly Cloudy, Clear)
Chance Precip	(Percent chance of Precip, 0-100)
Precip Type	(Tshwr, rain, frz rain, snow/rain, drizzle, none)
Temperature	(Max/Min temps as zone avg)
Relative Humidity	(Max/Min Relative Humidity in percent)
Wind Direction	(Wind Direction to 8 points of the compass)
and Speed(am/pm)	(Wind Speed to the nearest mph)
Precip Amount	(A precipitation range similar to RDF ranges)
Precip Duration	(How long precip will accumulate (in hours))
Haines Index	(Low Level Haines Index)
Lightning Freq	(Lightning Frequency if Lightning were to occur)
Mixing Height	(The mixing height to the nearest 100 feet at time of max/min temp)
Transport Wind	(Transport wind direction and speed through the Mixed Layer)
Dispersion Descriptor	(Categories based on the Dispersion Index)
Ventilation	(Actual value of the product of the mixing height and transport wind)

Remarks:

Any item which you deem necessary to enhance usage of the forecast, such as additional information on strength and areal extent of thunderstorms, lightning activity, frontal timing, sudden wind shifts, or any other unusual weather activity which may not be evident from the general forecast.

THE EXTENDED FORECAST INCLUDING WINDS (3 to 7 days)

The extended forecast is a basic narrative forecast of expected weather over the 3 to 7 day extended period.

THE 8 TO 14 DAY OUTLOOK

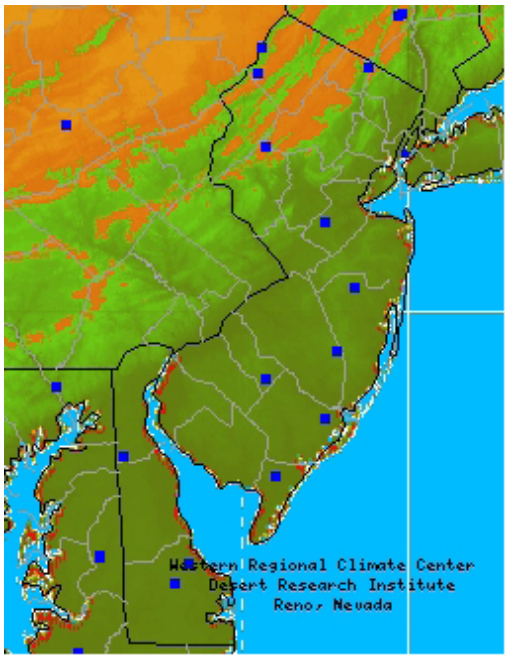
The Outlook is a general description of Temperatures and Precipitation vs Normal.

DISSEMINATION

Products are disseminated via the National Weather Service AWIPS Network and are transmitted on the NOAA Weather Wire Service. In addition, all forecasts are available on the Internet.

National Fire Danger Rating System (NFDRS) Forecast (FWM)

The National Fire Danger Rating System measures wildland fire danger at observation sites throughout the contiguous United States. The National Weather Service role in NFDRS is forecasting weather input which, combined with user input, allows the NFDRS software to predict the next day's fire danger indices. These indices impact agency resource management decisions, firefighter safety, and protection of the public and property. Note that a NFDRS station may represent a large fire danger rating area of similar climatology and fuel type. NFDRS forecasts for a station are intended to be applied across a large fire danger rating area.



INFO

The forecast will be for the previously determined RAWS stations. The product should be created and issued in GFE after the public forecaster has all required forecast elements completed and saved. Issuance of the FWM should be after 1300 LST, and preferably before 1600 LST.

GENERAL FORECAST

1. ZONE/FCST Shows whether this forecast is for an NFDRS zone or individual station. Zone average trends can be used when enough observations are available for the zone area. Choice between zone or individual station forecasts should be worked out in the AOP with fire weather users.
2. NO NFDRS Zone Number (or individual NFDRS site number)
3. YYMMDD Year, month, and day valid forecast time
4. 13 Always 1300 LST
5. WX Weather valid at 1300 LST tomorrow. Valid entries are:
    a. 0-clear
    b. 1-scattered clouds (1/8 to 4/8)
    c. 2-broken clouds (5/8 to 7/8)
    d. 3-overcast clouds (more than 7/8)
    e. 4-foggy
    f. 5-drizzle
    g. 6-raining
    h. 7-snowing or sleeting
    i. 8-showers (in sight or at the station)
    j. 9-thunderstorm

    (Categories 5, 6, or 7 sets wet flag to “yes”)

6. TEMP Temperature in deg F valid at 13 LST (or temperature trend + or -)
7. RH Relative humidity in percent valid at 13 LST (or RH trend + or -)
8. LAL1 Lightning Activity Level 1400 LST to 2300 LST (optional)
9. LAL2 Lightning Activity Level 2300 LST to 2300 LST (optional)
10. WDIR Use only for point forecast (FCST) version. Enter direction using sixteen point compass (N, NNE, NE, ENE, etc.) valid at 13 LST (20 ft level/10 minute average).
11. WSPD Enter wind speed in mph valid at 13 LST (or wind speed trend + or -, 20 ft level/10 inute average)
12. 10HR 10 hour timelag fuel moisture in percent valid at 13 LST (or trend + or -) (***Forecasted only for manual NFDRS stations***)
13. Tx Max temperature from 1300 LST today to 1300 LST tomorrow
14. Tn Min temperature from 1300 LST today to 1300 LST tomorrow
15. RHx Max relative humidity from 1300 LST today to 1300 LST tomorrow
16. RHn Min relative humidity from 1300 LST today to 1300 LST tomorrow
17. PD1 Precipitation duration in hours 1300 LST today to 0500 LST tonight
18 PD2 Precipitation duration in hours 0500 LST tonight to 1300 LST tomorrow
19. WETFLAG Y or N. Indicates whether liquid water will be on the fuels at 13 LST. (Use with caution - a "Y" will set all the NFDRS indices to zero!)

Format

The NFDRS Forecast will follow the comma delimited format as shown:

FCST,NO,YYMMDD,13,WX,TEMP,RH,LAL1,LAL2,WDIR,WSPD,10HR,TX,TN, RHx,RHn,PD1,PD2,WETFLAG

Examples of the point and zone products, formatted for transmission into AWIPS, are displayed below:

FNUS81 KPHI DDHHMM
FWMPHI

FCST,280071,030219,13,1,69,43,1,1,SE,8,,72,46,100,40,0,0,N

Follow the format precisely in order for the forecasts to be used as NFDRS input. Separate each element by a comma with no intervening spaces. (Some elements may not be forecast, but are represented by the null space between two consecutive commas.)

Updates and Corrections

Since the NFDRS system runs once a day, FWMs are not typically updated. The FWM will be corrected when a typographical/format error is detected.

SPOT FIRE WEATHER FORECAST

The National Weather Service Forecast Office in Mount Holly, New Jersey will provide upon request a specialized forecast for any wildfire as well as federal prescribed burns and land management projects. WFO Mt. Holly will also provide support to state initiated prescribed burns as long as a federal agency is present. Requests should only be made through the internet using the form available on the "Fire Weather" section of the Mount Holly website. As a backup (and only as backup!), a Spot Request Form (WS FORM D-1) can be used and then faxed (also available on "Fire Weather" section of the Mount Holly website.

Under optimal conditions, a forecast should be available in a short period of time. Only under the most adverse weather conditions will a forecast be delayed.

Because of the numerous non-forestry duties and forecast products, the staff at Mount Holly must ascertain the priority of the request among severe weather threats, aviation, marine, and public forecast deadlines. The requesting agency can greatly aid the forecaster by providing, at a minimum, the following information:

- Nature of the fire (wildfire/prescribed burn/land management)
- Location and size of the fire
- Name of the agency
- Elevation
- Recent weather observation
- Geography of the fire location
- Any additional information which would help the forecaster prioritize the request and to assist the forecaster to make the best forecast possible

The submission of at least one recent, accurate observation from the fire site cannot be overemphasized. Under National Weather Service policy, forecasters may refuse a spot forecast request for which an observation has not been made.

Constructive critique of spot forecasts by users is encouraged, preferably directly to the forecaster and substantiated by on-site observations.

FIRE WEATHER WATCHES AND RED FLAG WARNINGS

I. ISSUANCE TIMES AND PRODUCTS

Fire Weather Watches (PHLRFWPHL) are issued for the 2nd, 3rd or 4th 12 hour period of a forecast. A Red Flag Warning (also PHLRFWPHL) is issued for the 1st or 2nd period of a forecast.

FIRE WEATHER WATCHES AND RED FLAG WARNINGS WILL BE HEADLINED IN THE FIRE WEATHER FORECAST (PHLFWFPHL) AS WELL AS THE HAZARDOUS WEATHER OUTLOOK (PHLHWOPHI) AND INCLUDED IN THE AREA FORECAST DISCUSSION (PHLAFDPHI) WARNING SECTION.

If Red Flag Warning conditions are expected in the Day 2-7 period, it should be discussed in the Hazardous Weather Outlook (HWO), in addition to the Fire Weather Forecast (FWF), and Area Forecast Discussion (AFD). Near Red Flag Warning conditions for Day 1 can be mentioned in the HWO at forecaster's discretion, in addition to the FWF discussion and AFD.

After coordinating with Fire Weather partners, if it is determined that a Red Flag Warning is not needed, a Special Weather Statement may be issued if determined necessary. In certain situations, a SPS may be issued during the overnight without coordination with partners to give a "heads up."

II. GENERAL GUIDELINES

The Watches and Warnings indicate the potential for spread of any fires that may develop. They are NOT an indication or forecast of whether fires will develop.

Per ER Supplement 11-2004: Red Flag Warnings will **not** be based solely on weather conditions. Bottom line – coordination with the customer before the issuance of a *RFW* is critical to ensure that **both** the meteorological and non-meteorological (fuels) parameters will meet the necessary criteria.

There are rare situations when a Red Flag Warning can be issued on the overnight shift without coordination with partners. If surrounding offices are confident ALL factors, including fuels, will be below criteria, even without partner coordination, we can issue a Red Flag Warning. However, this is rare and should only be done when confidence is high that a borderline case will not occur and we will not be the only office issuing warnings. But again, this should be a rare occurrence, and if possible, waiting for coordination with state partners should occur most of the time.

III. INDIVIDUAL STATE INSTRUCTIONS

For New Jersey

The National Weather Service Forecast Office in Mount Holly will issue a Fire Weather Watch or Red Flag Warning, if the expected minimum relative humidity will be at or below 30 percent, sustained winds, or frequent gusts at or above 20 mph for 2 or more hours, and when the 10 hour time lag fuels are less than 10 percent.

For Pennsylvania

The National Weather Service Forecast Office in Mount Holly will issue a Fire Weather Watch or Red Flag Warning, if the expected minimum relative humidity will be at or below 30 percent, sustained winds, or frequent gusts at or above 20 mph for 2 or more hours, and when the 10 hour time lag fuels are less than 15 percent.

For Delaware

The National Weather Service Forecast Office in Mount Holly will issue a Fire Weather Watch or Red Flag Warning, if the expected minimum relative humidity will less than 30 percent, sustained winds will be at or above 20 mph, and when the 10 hour time lag fuels are less than or equal to 8 percent.

Maryland

The National Weather Service Forecast Office in Mount Holly will issue a Fire Weather Watch or Red Flag Warning, if the expected minimum relative humidity will less than 30 percent, sustained winds will be at or above 20 mph, and when the 10 hour time lag fuels are less than or equal to 8 percent.

The expectation of precipitation, in addition to the above criteria, will not diminish the need for a Fire Weather Watch or Red Flag Warning, unless the precipitation is widespread and concurrent with the initiation of winds described above.

Summary Criteria by State

State	Wind	Humidity	10 Hour Fuels
Pennsylvania	>=20 mph (Sustained/Frequent Gusts)	<=30 percent	<15%
New Jersey	>=20 mph (Sustained/Frequent Gusts)	<=30 percent	<10%
Delaware	>=20 mph (Sustained)	<30 percent	<=8%
Maryland	>=20 mph (Sustained)	<30 percent	<=8%

SIGNATURE PAGE

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Stephen Maurer Date
New Jersey Forest Fire Service
Division of Parks and Forestry
Department of Environmental Protection

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Randy White Date
Pennsylvania Bureau of Forestry
Pennsylvania Department of Conservation and Natural Resources

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Monte Mitchell Date
Maryland Forest Service
Maryland Department of Natural Resources

_____

Henry Poole Date
Delaware Fire Supervisor
Delaware Forest Service